NUI Galway
OÉ Gaillimh

Semester I Examinations 2009/ 2010

Exam Code(s)	4IF121
Exam(s)	B.Sc. in Information Technology
Module Code(s)	CT417
Module(s)	Software Engineering III
Paper No.	1
Repeat Paper	
External Examiner(s)	Prof. Michael O'Boyle
Internal Examiner(s)	Prof. Gerard Lyons
	* Dr. Owen Molloy
	* Ms. Karen Young
	* Ms. Pat Byrne
Instructions:	Candidates should attempt four questions, two questions from each section. All questions carry equal marks ***Use separate answer books for each section***.
Duration	3 hours
No. of Pages	4

Requirements:
MCQ
Handout
Statistical/ Log Tables
Cambridge Tables
Graph Paper
Log Graph Paper
Other Materials

Release to Library: Yes ☐ No ☐

SECTION A
(Project Management)

1. (a) Unreasonable deadlines are a fact of life in the software business. How should you proceed if you're faced with one? **[6]**

(b) Describe agility for software projects in your own words. **[5]**

(c) You have been appointed a software project manager for a small software products company. Your job is to build a breakthrough product that combines virtual reality hardware with state-of-the-art software. Because competition for the home entertainment market is intense, there is significant pressure to get the job done.

(i) Create a risk table for this project. **[8]**

(ii) Identify a risk monitoring strategy and specific risk monitoring activities for three of these risks, clearly indicating the factors you will be monitoring. **[6]**

2. (a) The following table describes the tasks in a systems analysis project, with task duration in weeks:

	Activity	Predecessor	Duration
A	Read company reports	None	3
B	Administer questionnaires	None	4
C	Conduct interviews	A	4
D	Analyse data flow	A	8
E	Prepare statistical analysis	B	5
F	Introduce prototype	C	3
G	Observe reaction to prototype	D,F	2
H	Perform cost-benefit analysis	D,F	2
I	Prepare proposal	E	2
J	Present proposal to all staff	G,H,I	6

Draw a Gantt chart for this project.
Draw a network diagram for this project and calculate the critical path. **[15]**

(b) The project manager for the above project left the company after an incident of bullying. You have been asked to take over from him. Describe some of the approaches you might take in encouraging the team to progress with work and complete the project on time. **[10]**

3. (a) You have been asked to undertake a new project introducing self-checkout registers in the university bookstore. Create a WBS for this project identifying all level 1 categories. Then break one of the level 1 items down to the third level. **[9]**

(b) Given that requirements changes will arise, what advice would you give a project manager, new to your organisation, for handling user change requests? **[6]**

(c) Agile and Unified Process models represent two very different approaches to the development of software systems.

(i) Compare and contrast their respective approaches to scope definition and risk management. **[6]**

(ii) Which approach would you recommend (and indicate why) for the development of the entertainment product in Q.1(c) above? **[2]**

(iii) Which approach would you recommend (and indicate why) for the development of the university bookstore self-checkout registers in Q.3(a) above? **[2]**

4. (a) A train company wishes to automate their ticketing systems so that a customer books on-line and then either prints out a (barcode) receipt or receives an SMS with confirmation. This represents the ticket for their journey. There will be hardware systems at each station which automatically validate tickets. Describe the steps you might take in creating a cost estimate baseline for the full computer system (software, hardware, training and installation) which you are to present to management. **[15]**

(b) Describe the steps you might take in deciding whether or not to outsource the software part of the ticket system described above, and list any particular details which you might want to include in the contract if the decision is to have this piece of work written by an outside supplier. **[10]**

SECTION B

(Quality – Dr. Owen Molloy)

5. (a) From the perspective of an end-user of a software system (such as an online shopping site), how would you define Software Quality? **[8]**

   (b) You have been asked to measure quality at different stages in the life cycle of a project software development. Assuming the project follows a standard waterfall life-cycle, what metrics would you recommend at each stage in the life-cycle. **[9]**

   (c) Explain the difference between Quality Improvement Teams and Quality Circles. **[8]**

6. (a) List and describe the main steps involved in a Software Process Improvement project**.** **[8]**

   (b) What is the difference between a Staged and Continuous implementation of CMMI? **[8]**

   (c) How would you characterise the differences between organisations at Levels 1, 2 and 3 of the CMMI? **[9]**

7. (a) Explain the importance of the following Quality Management principles central to ISO 9000: **[10]**
   - Customer Focus
   - Involvement of People
   - Process Approach

   (b) You have recently joined the QA team in a large software organisation. You have been asked to initiate a process for Code Reviews. Describe the following: **[15]**
   - The advantages of performing code reviews
   - Potential issues which might be encountered
   - The roles which you think should be filled in each review team
   - How reviews should be conducted

8. (a) List and Describe the different phases of a DMAIC project**.** **[8]**

   (b) You have noticed that there is a large degree of variability in the defect rates achieved in different software projects. Explain what the cause of this variability might be. **[8]**

   (c) Describe how you would conduct Root Cause Analysis to analyse the defect problem outlined in 8(b) above. **[9]**